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ABSTRACT

Following a review of empirical research on teacher feedback to students' wrong responses, this paper describes a paradigm for use with direct instruction materials, applying the feedback model to comprehension tasks from traditional reading and science textbooks. The next section details a classification system for wrong responses grouped into four classes: lack of information, motor, confused, and rule application. The third section discusses five correction strategies--modeling, leading, testing, retesting, and mastery units--and provides guidelines for using them, while the fourth section presents scripted examples of each type of correction. The paper concludes with a review of the paradigm, a discussion of techniques, a discussion of teachers' opportunities to use the paradigm, the paradigm's limitations, and the criticism that direct instruction is mechanistic. Appended is a figure showing the direct instruction feedback paradigm. (EL)

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CENTER FOR THE STUDY OF READING

Technical Report No. 354

STRATEGIES FOR CORRECTING STUDENTS' WRONG RESPONSES

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The work upon which this publication is based was performed pursuant to Contract No. 400-81-0030 of the National Institute of Education. It does not, however, necessarily reflect the views of this agency. Siegfried Engelmann and Wesley Becker of the University of Oregon Direct Instruction Follow Through model fostered many of the ideas in this paper to give teachers general strategies for correcting wrong responses. In our work with disadvantaged children we learned quickly that children make mistakes, even with carefully sequenced instruction. Engelmann initiated this work on a correction paradigm.

In 1979 I spent several weeks pouring over research in reading in fruitless pursuit of studies on correction procedures. Barak Rosenshine directed me to Lumsdaine's work on feedback, proclaiming that I had been looking in the wrong places. He was right, of course. So, as I tackle this topic again, I wish to thank Barak publicly for his perception and thorough knowledge of our field. More recently, Jere Brophy gave me suggestive feedback on my notions of corrective feedback. In addition, the anonymous reviewers' comments were very helpful.

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Abstract

This paper reviews empirical research on teacher feedback to students' wrong responses, and in particular feedback to miscues, before describing the sustained feedback paradigm that grew from work with the Direct Instruction programs. The general principles from the paradigm are applied to basal readers and content area textbook selections. Procedures and definitions are presented for classifying wrong responses into four categories of mistakes: lack of information; motor, confused information; and rule application. Five correction strategies--modeling, leading, testing, retesting, and mastery units are described. Then, correction sequences are provided to illustrate the application of the paradigm. The discussion section addresses teachers' opportunities to use and the limitations of the paradigm, as well as the criticism that direct instruction is mechanistic.

To Err is Human, But Then What?: Correcting Wrong Responses

A little more than half a decade ago, Rosenshine (1979) combined research findings to produce a model of teacher effectiveness. He synthesized results from a number of independent researchers (Good & Grouws, 1979; Stallings, Cory, Fairweather, & Needles, 1977; Stallings & Kaskowitz, 1974) studying basic skills instruction with primary grade, disadvantaged (poor) students. Rosenshine (1979) calls this model direct instruction. He describes direct instruction as:

> Academically focused, teacher-directed classrooms using sequenced and structured materials . . . teaching activities where goals are clear to students, time allocated for instruction is sufficient and continuous, coverage of content is extensive, the performance of students is monitored, questions are at a low cognitive level so that students can produce many correct responses, and feedback to students is immediate and academically oriented. (p. 38)

At the same time that Rosenshine's work appeared, Gersten (1979) reported a study of the effectiveness of teachers and paraprofessionals implementing direct instruction. Gersten measured his subjects' pacing, the rate of teacher/student interactions; signals, techniques to keep homogeneous small groups responding together; following formats, their adherence to scripted lessons; and instructional feedback, their corrections

after wrong responses. First, Gersten examined the frequency with which his subjects used these four techniques. Next, he correlated the teachers' use of these techniques with student achievement. He found that teachers who paced instruction rapidly, maintained high rates of student accuracy, and corrected wrong responses produced the highest student gains. He also found that of these four techniques, correction procedures and high rates of student accuracy (which correlated highly) were the most "sophisticated" teaching behaviors. Teachers took the longest to master them.

Research on Feedback

Empirical support for the importance of teachers' feedback to wrong responses comes also from The First Grade Reading Group Study (Anderson, Evertson, & Brophy, 1979). First, Brophy and Evertson (1977) completed a correlational study with 31 teachers. From these data they produced an instructional model (Anderson, et al., 1979) that focused on management of a class as a whole (16 principles) and instructional feedback to students' answers (6 principles). They next conducted an experimental study during which teachers were to: (a) wait for a child to respond, but indicate that a response was expected if a child failed to respond after a brief wait; (b) indicate when a child was wrong; (c) give the answer if the question was factual, provide clues if the answer could be reasoned out, or furnish the answer if the child could not produce a correct answer after hearing clues; (d)

acknowledge correct answers--often by repeating good responses; (e) praise moderately; and (f) criticize specifically.

In this experimental study 27 first-grade teachers received a manual describing the instructional model and limited in-service training in its application. Significant effects were found for teachers using sustained feedback, "staying with" the student who first made the error, though the model did not describe precisely how teachers should respond to wrong responses. Most sustained feedback led to improved answers. Process feedback (responses after errors that led students through steps to come up with the correct answer) also led to higher student performance, though ceachers seldom used process feedback. Treatment teachers also gave more specific praise to students, though overall they praised students less than did the control teachers. Neither group criticized students often. There were three other interesting differences between these treatment and control teachers that complement Gersten's (1979) findings. Treatment teachers had higher percentages of correct answers (73% as compared to 66%), fewer instances of students failing to respond, and fewer reading errors in their classes.

Kulhavy (1977) reviewed research on teachers' written feedback (feedback was defined as teachers' written responses to students' right or wrong responses) with various types of instruction. He concluded in his analysis of over 60 studies that feedback increases what a person learns from instruction by

confirming correct responses and identifying errors; however, if material is very difficult, students guess at answers and try to match answers and feedback. Kulhavy concluded that feedback after wrong responces may have the greatest positive effect on student learning.

More recently, Hoffman and Clements (1984) reviewed the sparse research on teacher feedback during oral reading. They conclude that: variation in feedback can affect pupil performance; teachers interrupt poor readers more often than they interrupt good readers. Teachers typically tell poor readers the words or prompt them to use graphemic cues more often than they do with good readers. This review does not provide guidance on developing a general model of teachers' feedback to miscues.

Hoffman and Clements (1984) then conducted a study to describe types of teacher feedback; to determine whether or not teachers' feedback varied according to a group's abilities, and to explain the relationship between teacher feedback and student performance. They found differences in time and types of reading activities for high- and low-performing groups, as well as differences in error rates. They also noted that teachers used terminal feedback most frequently with low performers, either telling students the correct word (50%) or giving no feedback (35%), whereas with high performers there was no feedback 73% of the time. Teachers gave the answers to another 16% of the

miscues. Low and high groups received only 15% and 11% sustained feedback, respectively.

These data were gathered in a natural setting and therefore simply describe what teachers typically do. Aside from the consistent, positive relationship found between sustained feedback (and the consistently low rate at which teachers give sustained feedback in natural settings), there is little in the current literature about sustained feedback. This paper suggests a model for when and how teachers should use sustained feedback.

Miscue Analysis

Another major area of research has focused on student performance during oral reading. Typically, these studies document the frequency and types of miscues (wrong responses) students make, how teachers respond to these miscues, and then how teachers' behaviors correlate with student errors. For example, D'Angelo (1981) studied differences in miscuing behavior, such as corrected substitutions, nonsense, or real word substitutions, of good and poor readers, and found that good readers self-correct more than poor readers. However, Englert and Semmel (1981) concluded that comprehension performance was not predicted by specific types of miscues. Guzetti (1984) later found that high-, average-, and low-ability students were equally proficient at using syntactic and semantic cues. She concluded that content alone does not affect readers' abilities to reconstruct meaning.

Experimental research. Empirical support for the effects of teachers' instructional feedback to wrong responses with older students comes from another study. Meyer (1982) found that middle-grade poor readers to whom teachers simply told the correct word after word identification errors in the first 70 lessons of Corrective Reading (Engelmann, Johnson, Becker, Meyer, Carnine, & Becker, 1979) performed as well on individually administered criterion-referenced and norm-referenced reading measures as comparable groups to whom teachers taught complex word-analysis corrections.

Suggestions to teachers. What research is there to guide teachers in applying miscue analysis during instruction? In 1979 Hoffman presented a conceptual framework showing teachers how to provide feedback to reading miscues. His proposal focused on three areas: to which miscues teachers should respond, and when and how. Hoffman asserts, "Perhaps the most immediate manner in which teachers vent their theoretical orientation during instruction is through the form of feedback provided to students while they miscue during oral reading" (p. 343). He drew support for his model from numerous research studies in a variety of contexts and proposes that teachers, "analyze their current strategies with respect to each of the dimensions presented" (p. 348), thereby giving teachers responsibility and opportunity to develop feedback paradigms.

Of Rosenshine's nine c@haracteristics of direct instruction, monitoring and feedback are two teaching behaviors that have been studied in several explicit contexts, but they have not previously been explicated, or examined apart from the Direct Instruction model. The purpose of this paper is to describe the sustained feedback paradigm developed by Meyer, Fox, and Granat in 1973 for training teachers to implement effectively the Distar Reading I (Engleman & Bruner, 1969, 1974) and other Direct Instruction programs. These programs are used in the University of Oregon Direct Instruction Follow Through model as well as in numerous other school districts that have adopted Direct Instruction materials. This paradigm first classifies students' wrong responses and then articulates teaching procedures to use in response to student errors. The classification system gives teachers a system for grouping wrong responses. The system can then move teachers from dealing with each mistake in isolation to conceptualizing a wrong response into an instructional network. The paradigm also offers teachers direct teaching strategies to use when students make mistakes.

All students make mistakes and mistakes are particularly prevalent when teachers present new or difficult material. But, Blank (1973) pointed out that low-performing students in particular develop mistake patterns early in their educational experiences. Blank argues furthermore that errors are not merely a developmental phase for low-performers. There are essential

differences between errors when children lack information to answer questions and errors that suggest that a child has already confused concepts or operations. Without feedback procedures that categorize the types of errors for teachers and provide teacher-directed strategies to instruct student in correct responses, mistake patterns build independently and upon each other until students become thoroughly confused and as a result function at a constant low level. To prevent this snowballing effect from cumulative wrong responses, teachers need to give constant, corrective feedback as students make errors.

Although the model presented in this paper was developed for use with Direct Instruction materials, the general principles apply to traditional textbooks as well. In fact, these procedures should be particularly helpful to teachers using a variety of materials. Because basal readers and content-area textbooks typically are not developed by adhering to specific instructional procedures such as the steps for effective teaching, for example, demonstration, guided practice, and independent practice (Rosenshine & Stevens, 1984). Therefore, these teachers receive little guidance from their materials to provide sustained practice. My goals in this paper are twofold: to describe the Direct Instruction sustained feedback model; and to apply that model to comprehension tasks from a number of traditional reading and science textbooks.

The next section of the article details a classification system for wrong responses. The third section defines four correction strategies and provides guidelines for when to use them. The fourth section presents scripted examples of each type of correction. The article concludes with a review of the paradigm and a discussion of these techniques. Throughout this article wrong responses to reading comprehension items from basal readers and elementary science texts are used as examples, although each type of mistake also occurs during decoding, language, math, and social studies instruction.

Classifying Wrong Responses

Wrong responses are grouped into four classes: (a) lack of information mistakes, (b) motor mistakes, (c) confused information (discrimination) mistakes, and (d) rule application mistakes. Although it may be possible to generate examples of mistakes that overlap these categories, most wrong responses fall neatly into one of these categories. Therefore, the first step a teacher must take to correct a wrong response is to classify it. Guidelines for classifying the four types of mistakes follow.

Lack of information mistakes. A lack of information mistake might occur in response to questions such as, "When did the Civil War end?", "Where did this story take place?" or, "What numeral is this?". If a student answers "Chicago" to the second question when the correct answer is New York, and Chicago was not mentioned in the story, this is an information mistake. Or if a

student responds, "I don't know," when asked, "Where did this story take place?", this is also a lack of information mistake. In both cases, the teacher should assume that the student lacks information to answer the question, even though the answers appear in the text. If a student responds, "6" when the teacher points to 3 and asks, "What numeral is this?", the teacher should also assume that the student simply does not know what the numeral is, if 3 has not been taught.

Teachers should classify errors as lack of information mistakes only if students say they do not know the answer or if they respond with an answer that has neither been taught nor appears in the text. With all lack of information mistakes, the teacher assumes that, for whatever reason, the student does not have enough information to answer the question.

Motor mistakes. A motor mistake occurs when a student appears to have the correct information to answer a question but cannot produce a correct response. In reading comprehension exercises, these mistakes occur infrequently. They occur more frequently in science activities. A motor mistake occurs if the teacher asks, "What Japanese city suffered substantially when an atomic bomb was dropped?" and a student responds, "Hirosh." The student appears to be trying to say "Hiroshima," but simply does not pronounce the word correctly. The student apparently knows the answer to the question but does not produce the answer articulately. If a student were asked to "change the shape of

the liquid" by pouring water into a balloon, twisting the balloon closed, and then poking the balloon to "change" it, the student might have difficulty because he/she lacked the dexterity to perform these steps. This would also be a motor mistake. Although motor mistakes are frequent in activities, they are infrequent in basic skills instruction.

Confused information (discrimination) mistakes. A discrimination mistake is quite different from either a lack of information mistake or a motor mistake because this type of wrong response shows that a student has confused facts, concepts, or other things.

Confused information (discrimination) mistakes are among the most complicated wrong responses that students make. For example, after students read several paragraphs on shoes, the teacher might ask, "What was the main idea of this passage?" A student might respond "grass shoes." If shoes made from grass were one type of shoe mentioned, but the passage described other kinds of shoes as well, the student may have confused a detail from the passage with the main idea of the passage.

Discrimination mistakes are particularly complicated to correct because the teacher must determine the relationship between the student's response and the appropriate answer to the question, and this connection is not always readily apparent. A similar predicament exists for teacher and student if during oral reading a student looks at the word, "left" and reads, "felt."

In this case, the teacher would probably be correct to assume that the student has confused these two words.

Rule application mistakes. When students read either narrative or expository texts that include rules, they may not be able to apply these rules to new examples. If the "rule" presented in a text is, "All bicycles have two wheels," and an application item is, "Maria has a bicycle. What do you know about it?," the student who responds with anything other than, "It has two wheels," fails to apply the rule from the text.

A similar application mistake could occur if students learned a rule about friction (when you rub two things together they get hotter), and a rule that heat causes liquids to evaporate, but then could not apply these rules to explain why on a rainy night they could "see" tire tracks from a car ahead. This would be a rule application error. A student who answers, "The tires picked up water," fails to apply the three rules. A correct response that utilizes the three rules would be, "As tires roll they rub on the ground and create friction. Friction creates heat. The heat evaporates rain from the pavement, and, therefore, the paths of the tires look like tracks."

In summary, there are four categories of wrong responses: lack of information mistakes, motor mistakes, discrimination mistakes, and rule application mistakes. After each wrong response, the teacher must first determine what kind of mistake the student made because each class of mistake requires a

different type of correction procedure. Correction procedures for all types of wrong responses involve combining demonstrations, guided practice, and independent practice. The next section of this article describes correction strategies and sequences that provide demonstrations and guided practice in order to correct students' lack of information and motor mistakes. It also explains when teachers should use each strategy.

Five Correction Strategies

Five basic strategies--modeling, leading, testing, retesting, and mastery units--are used to correct lack of information and motor mistakes. Regardless of the sequence of models, leads, and tests used, the final step in each correction should be a retest of the student(s) who made the initial mistake. In other words, the teacher again presents the original task to the students, to determine whether or not they can perform the whole task correctly. As students pass retests, previously missed items should be incorporated into mastery units.

Modeling. To model, a teacher demonstrates a response. A demonstration could be as simple as pronouncing a word correctly. A more complicated demonstration might require a teacher to show students how to sequence events from a story. Whenever a teacher determines that students need to have a strategy demonstrated for them, it is appropriate for the teacher to model.

Modeling is only a demonstration, and if a task is at all difficult, students may not be able to replicate the teacher's performance. Wrong responses to complicated tasks will frequently require a teacher to model and then lead.

Leading. Leading is guided practice. To lead, a teacher performs a task with students. As the teacher and students perform a task together, students may begin to make mistakes. They will often correct themselves, however, as the teacher leads. This guided practice is like training wheels on a bicycle. While watching, listening, and performing with their teacher, students avoid making many mistakes.

Teachers often need to repeat a lead several times, prompting frequently or questioning as students gradually change their behavior. A lead provides the guided practice that students often need to perform a difficult task on their own. After leading students through tasks, particularly through complicated tasks, a teacher should then see if students can perform alone. Teachers should resist the temptation, however, to lead once or twice and then have students perform alone. In fact, if students cannot perform a task correctly with the teacher leading, they will seldom be able to perform it alone.

Testing. The step in the correction where students do perform alone is called a test. The purpose of a test is for the teacher to evaluate students' responses. A test that is immediately preceded by other correction strategies (some

combination of models and leads) may not indicate whether or not students have mastered a task. In fact, students may respond correctly on a test even if they have not achieved mastery simply because they just participated in guided practice. The teacher must therefore include three additional steps in the correction sequence: (a) retest students on a task similar to the one they failed initially; (b) provide enough practice so that students become confident on the task; and (c) give students a mastery unit that incorporates tasks like the one they performed incorrectly before advancing to the next part of the lesson.

Retesting. Retesting is an important step in the correction sequence because, though students can often perform a task immediately after sequenced models and leads, they may not be able to perform the same task in isolation even a few minutes later. Simply put, it often takes a while for a correction to "take," and it is therefore important for students to receive spaced retests. A well-designed retest is a variation of the failed task presented to students a few minutes after they have completed their first correction sequence. When teachers preview lessons before teaching, they can identify logical places for retests and then be prepared to deliver retests as students need them.

A retest is identical to a test except for its purpose, which is to determine if students can perform a task they could not, several minutes after they were corrected. After retesting,

the teacher must judge whether or not students can perform a task with confidence. When students have mastered a skill, they respond immediately and confidently. If students respond hesitantly with faltering voices, or if they require a great deal of time before responding at all, they are not yet confident. Usually, repeated practice with the teacher demonstrating, guiding practice, and providing independent practice on a variety of examples gradually gives students the practice they need to respond confidently.

Practice to get students to a confident level of expertise is as important as executing all the other steps in the correction sequence. This is because complex operations such as solving math problems or sounding out words require students to recognize letters and numerals automatically and before students can turn their attention to more complicated processes.

Mastery units. Retesting and working with students until they are confident are important prerequisites before giving students mastery units that include examples previously failed. For instance, a lesson's vocabulary words might become a mastery unit before small-group reading, or teachers might review a series of comprehension questions after an appropriate text segment as another type of mastery unit. The end of a sentence would be the logical unit for word- and sentence-level questions, just as the end of a paragraph would be a unit for sentence-and-paragraph level questions.

One of the most complicated aspects of teaching teachers to give sustained feedback after wrong responses stems from the unavailability of a formula that specifies when and in which sequence to use each strategy. The next section of this article describes how teachers can monitor students' responses to determine which correction strategy to use when.

Sequencing Correction Strategies

If teachers understand the functions of modeling, leading, testing, retesting and mastery units they will better know when to use each function. Teachers who watch students carefully during instruction learn when to give feedback. Whenever students show that they lack information, or cannot perform at all, they need to see a demonstration. Therefore, the teacher should model. Modeling should occur most often: (a) when presenting a new skill; (b) if the students' responses are far from a correct response; or (c) if the teacher has lead so much that he/she wants to break up the sequence to demonstrate the response. Modeling should always be short because the teacher wants to hold students' attention, and because during modeling the teacher has no way to assess what students are learning.

Because the purpose of leading is to change students' behavior, it is important to lead whenever students have trouble producing a correct response. Teachers can combine several leads, perhaps half a dozen at a time, with modeling interspersed

occasionally, to provide guided practice and a clear demonstration of a task.

If, for example, a teacher had first modeled selecting sequential events from a text and was ready to lead students through the next portion of text, the series might go like the one that follows. In each example, "T" identifies teacher talk, "T & S" teacher and students, and "S," a student alone.

T: Now that I've shown you how to figure out what happened first, next, and so on, we'll do the next few paragraphs together. Let's read aloud and whenever we come to a sentence that describes something new happening we'll raise our hands and stop.

T & Ss: (Read) "Plant a garden on a sponge. Then see what differences there are among the plants of the same species." (T and Ss hands go up.)

T: What are we reading about?

S: Planting a garden on a sponge.

T: Good. Let's read on.

T & Ss: (Read) "First, rinse a sponge well to wash away unwanted chemicals." (T and Ss hands go up.)

T: What should you do first?

S: Rinse the sponge well.

T: Read on.

T & Ss: "Next, place several rows of seeds on it. Use a different species of seed in each row." (T & Ss hands go up)

T: So, what do you do next?

S: Make rows of several different species of seeds.

T: Here is what to do first and second.

First, rinse a sponge well to wash away unwanted chemicals.

Second, place several rows of seeds on the sponge.

Now, let's read on to see what to do next.

T & S: "Place the sponge in a container where it will stay damp . . ." (Text from Science, Rockcastle, V.N., McKnight, B. J., Salamon, F. R., Schmidt, V. E., Addison-Wesley, Level 6, 1984, p. 234.)

In this example, the teacher had already modeled and now leads students through several sentences, responding with them to identify what the text told them to do first, second, and third. A pattern of similar leading with intermittent modeling might continue for several more paragraphs. In this process, students learn to remember a question while they read in order to answer it. Therefore, teachers need to guide students so that they return to the text to process more than just text segments that answer a question.

A feedback sequence might look something like sequence 1 or 2 in Figure 1. The length of the chain depends upon students' performance. Student responses determine if the teacher should model, lead, test, retest, or give a mastery unit.

Insert Figure 1 about here.

Modeling Corrections

Lack of information mistakes. Students are reading a story from a basal reader. The teacher asks, "What was Anna to bring to court?" A student responds, "A hundred gold coins," but the correct answer is "A hundred silver coins." Assuming that "gold coins" did not appear in the passage and therefore could not be the answer to another question, the teacher begins the correction sequence by modeling:

T: What was Anna to bring to court?

S: A hundred gold coins.

T: A hundred silver coins. Let's go back through the story to answer the question again. The question is, "What was Anna to bring to court?" Read the first sentence. Does that sentence tell what Anna was to bring to court?

The teacher would continue this process through the passage until the students read sentences that answer the questions. This sequence combines modeling and leading. The teacher models

finding the answer in the text and leads students through the sentences one by one until they find the answer to the question.

Why return to the text instead of asking another child the question or simply supplying the answer? Although these procedures may strike some readers as more efficient, they are terminal feedback to the student who made the initial error. Furthermore, students need to learn to search the text to answer a question as long as the answer is in the text. Learning to search the text for answers to literal comprehension questions is important, because answers to such questions are in the text. This habit is probably even more important with expository text than it is with narrative text, where students are expected to learn from what they read and to remember information. It would be appropriate to shorten this procedure after leading students systematically through texts a few times. It is also important to modify this procedure to help students learn to respond to questions that are answered either incompletely or not at all in the text.

Motor mistakes. As mentioned previously, reading comprehension motor mistakes occur infrequently. Occasionally, however, a student may not be able to pronounce the words in an answer correctly. Motor mistakes are much more prevalent with handwriting exercises or science activities that require dexterity. With every motor mistake, the teacher assumes the student "knows" the answer but cannot produce it. Sustained

feedback to a response that is wrong simply because the student could not pronounce a word would look like this:

T: Which Japanese city suffered the most after an atomic bomb was dropped there?

S: Hirosh.

T: Hiroshima. Listen again, Hiroshima. Everybody say it with me this time.

T & S: Hiroshima.

T: Again, together.

T & S: Hiroshima.

T: (T returns to S who made wrong response) Let's hear you all by yourself.

S: Hiroshima.

T: Very good. That's a hard word to say.

Lack of information and motor mistakes are reasonably easy to correct because either students have the information to answer the question but just have trouble producing the response, or they simply lack the information to produce the response. In either case, a teacher need not develop particularly complicated correction sequences. Sequenced modeling, leading, testing, and retesting will suffice. Confused information mistakes (discrimination errors) and wrong responses to rule application items, on the other hand, require more complicated correction sequences because these wrong responses demonstrate that students are confused.

Confused information mistakes. To correct confused information (discrimination) mistakes, a teacher needs to know how students' incorrect responses are related to the correct response, and what students have been taught. With reading comprehension errors on text a few paragraphs or pages long, the critical difference between a lack of information mistake and a confused information mistake is whether or not the correct answer and the answer student(s) gave are both either explicitly or implicitly in the text.

Here are two examples. If students are reading a few paragraphs about cheeses and the teacher asks, "What is the main idea of this passage?", a correct answer might be, "There are many different kinds of cheese." If a student responds, "White and yellow cheeses," and if color was only one of several characteristics of cheese described in the paragraph, the student has confused details with the main idea of the passage. To correct this confusion, the teacher should give the student feedback that first identifies what the student's response does tell, "Color is just one characteristic of the cheeses mentioned in these paragraphs," for example. Such feedback shows students both how their responses relate to the teacher's question and how they are wrong. Next, the teacher should model and lead the student through the passage to derive a phrase that is a correct main idea. The model/lead/test sequence might go something like this:

T: I'm going to show you one way to figure out the main idea of this passage. Remember, the main idea is what the whole passage is about. Jeremy, read the first sentence.

S: If you have ever gone to a store that sells cheese, you know that there are many different kinds.

T: What is that sentence about?

S: There are many different kinds of cheese.

T: Good. Let's keep track of what each sentence is about. I'll write down "many kinds of cheese" and put a mark under it to show what one sentence we've read is about. Read on to find out what the next sentence is about.

S: There are white and yellow cheeses.

T: What is that sentence about?

S: Colors of cheeses.

T: Ok. So, I'll put another mark under kinds of cheeses because different kinds of cheese are different colors. Two sentences so far have been about kinds of cheeses. Next sentence.

S: There are soft and hard cheeses.

T: What is that sentence about?

(Text from Ring Around the World, Early, M., Cooper, E. K., Santeusanio, N., Harcourt, Brace, Javanovich, Level 9, 1983, p. 8).

The teacher would continue this process through the passage, keeping a tally of what each sentence was about. Then, when the group had finished reading, students could count the marks under

each phrase. The group could then determine what most of the sentences in the passage were about and declare that the Main Idea. Then the teacher would alternate between asking, "Tell me a detail from this passage," and, "Tell me the main idea of this passage." Steps in this sequence are similar to those developed by Stevens (1983) for teaching Main Idea in a PLATO computer assisted instruction lesson.

The model and lead correction series would be similar to the previous example if the teacher had asked, "What happens to the leaf?", while students read text about putting an African violet leaf onto damp sand. If a student responded, "It's on top of the sand," a sentence telling where the leaf is, the student confused what happened to the leaf with the leaf's position. First, the teacher should lead students to the part of the text that tells what happens to the leaf and then alternate questions about where the leaf is and what happens to it. The correction sequence for this confused information could go something like this:

T: You told me <u>where</u> the leaf is. I asked <u>what</u> <u>happened</u> to the leaf. Here's how we find the answer to my question. Read the first sentence.

S: Put some damp sand in a container.

T: Does that sentence tell what happened to the leaf?

S: No.

T: Okay. Remember the question we want to answer. Keep reading.

S: Then place an African violet leaf on top of the sand. Cover the leaf and its container with clear plastic to keep the sand from drying out.

T: Do we know yet what happened to the leaf? No. So, we have to keep reading.

S: Soon the leaf will grow roots.

T: Does that sentence tell what will happen to the leaf?

S: Yes.

T: What will happen?

S: It will grow roots.

T: Now, tell me where the leaf is.

S: On top of the sand.

T: Tell me again what will happen to the leaf.

S: It will grow roots.

With both the main idea and the sequencing corrections, the teacher modeled and lead to demonstrate how to find information in the text to answer the question. At the same time, the teacher clarified how the students' responses matched questions. The teacher told the students which question their response answered.

This procedure may also seem tedious and time-consuming, and some might wonder what general learning these procedures teach. There are a few procedures for expediting the correction procedure while still returning to the text. First, if the relevant information students need appears more than a few

sentences into the text, the teacher can begin the correction there. Then, once students locate the information in the text, the teacher can ask a series of questions from the "pair" of questions. One member of the pair should always be the teacher's original question (in this case, "What happened to the leaf?") and the second member would be the appropriate question for the students' wrong response (Where is the leaf?). The general strategy students learn from this process is to search the text for answers and, in this case, to discriminate "what" from "where" information in the same passage.

Rule application mistakes. A teacher points to pictures of a jaguar, a bald eagle, a sperm whale, and a giant redwood tree, and says, "Here are four species that are decreasing in number, what do you suppose might be causing this to happen?" A student responds, "There are not very many of them left." Let us assume that this class is studying a text that presents species that have survived, and that this student's response did not integrate that information. The teacher's responsibility in the correction sequence is to help the student formulate an answer that incorporates rules from the text.

This feedback is complicated because the teacher must first model how students can integrate what they have learned about overproduction. Then the teacher needs to model and lead from the rules in the text to applying the rules to answer the

question, "Why are some species decreasing in number?" Here is a rule application correction example:

T: Yes, there are not very many of them left, but there are rules that you have learned that explain how this happens. Listen again. Here are four species that are decreasing in number. What do you suppose might be causing this to happen? Now we have to figure out which of the rules we have learned will answer that question. After we have listed rules that apply to this problem, we are on our way to explaining why these species are decreasing. Flip through your texts to the lessons on overproduction as I ask you questions. What happens when living things produce large numbers of offspring?

S: The offspring compete with each other for the things they all need.

T: What do they compete for?

S: Food, water, and sunlight.

T: And what happens when things compete?

S: They all cannot survive.

T: And which ones do usually survive?

S: The fittest.

T: Right, and several lessons ago we had a list of what "fittest" means.

S: I don't remember.

T: Ok, let's go back to the story entitled, "Overproduction, Lesson 1." Read until you find the sentences about "the fittest."

S: That means: the strongest, the fastest, the hardiest, the smartest, the ones who can live on the most kinds of food, the ones with the keenest senses, and those most able to live near people.

T: Let's put those characteristics on the board.

T: Now let's return to our original question. Here are four species that are decreasing in number. What might have caused this to happen?

S: Only the fittest survived.

T: And, what does that mean, "Only the fittest survived?"

S: The only redwood trees that survive are the strongest, and the hardiest.

T: And which jaguars survive?

S: The strongest, fastest, smartest, and the ones with the keenest senses.

T: Now let's go over these examples again. I want you to talk each one through with me. This time we'll write the answers to our questions.

At this point, the teacher would lead and model writing an answer to the question using much the same process that he/she used first to talk the students through the answer. This type of correction can be complicated for teachers because they must know

which information is presented where in the text, as well as how to model and lead students through finding rules and facts and integrating those pieces of information to answer the original questions.

Summary

In summary, wrong responses fall into four categories. Lack of information mistakes are in one way the easiest errors to correct because the teacher need only supply the answer and give students practice answering the question. Motor mistakes usually require the teacher to lead repeatedly because the student's problem is not in knowing the answer but in producing the response. Discrimination and rule application mistakes require the teacher first to know what has been taught, and second, to decide if the student has confused pieces of information or failed to apply rules or principles to derive an answer.

If a student has confused information, a teacher must construct pairs of questions to represent the student's wrong response and the initial question. With rule application mistakes, the teacher redirects students to the text to review, integrate, and apply information. In all of these sequences teachers model (demonstrate the task for students), lead (perform the task with students), test (have students respond alone), go on to other activities but retest to check students' performance again, and finally present a mastery unit before going on to other parts of the lesson.

Discussion

This portion of this paper addresses three issues that may arise as one thinks about the paradigm presented in this paper.

What opportunities does this paradigm present for teachers using traditional materials? Basal reading and content area textbooks have frequently been criticized for covering information lightly, or "mentioning" topics, instead of teaching. Implementation of this paradigm allows teachers to focus on students' errors and to use those wrong responses to teach, to give more attention to tasks giving students trouble.

What are the limitations of this correction paradigm? This paradigm best accommodates memory tasks and problem solving tasks for which answers appear in the text. The paradigm would need to be expanded for teachers to utilize it with tasks requiring the integration of background knowledge and text-based information. This paradigm does not accommodate qualitative aspects of correcting wrong responses such as wait time between a teacher's asking a question or presenting a problem and students' responses, or the point at which teachers reach diminishing returns (such as while leading), for example, because a task is very difficult for students. These qualitative variables would all be appropriate areas for future research.

Is direct instruction teaching mechanistic? Critics of direct instruction often describe the teaching strategies inherent in the model as rote, uncreative, and simplistic because

of their structure and regimentation, thus implying that direct instruction teaching is easier than less structured, "child-centered" models. I argue the contrary. Teachers using the correction paradigm presented in this paper must make sophisticated decisions quickly, and they must focus constantly on student responses. This is hard work. These teaching behaviors are far from rote, and they require training and practice. Teachers using these strategies are not only business-like and task-oriented, they are also careful monitors of student performance. They teach in highly interactive ways, judge students' responses, and make innumerable decisions in split seconds.

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Figure 1

Direct Instruction Feedback Paradigm

Students Respond

Teacher Judges